

CLAIMS

1. A laser processing method for crystallizing an amorphous material by irradiating a layer formed of the amorphous material constituting a substrate or a layer formed of an amorphous material on a substrate with a laser beam, comprising:

irradiating a first region defined on a surface of the layer formed of the amorphous material with a laser beam so that the amorphous material in the first region is melted;

solidifying and crystallizing the molten amorphous material in the first region;

irradiating a second region that is defined on the surface of the layer formed of the amorphous material and overlaps the first region in a predetermined portion thereof with a laser beam so that the amorphous material in the second region is melted;

solidifying and crystallizing the molten amorphous material in the second region;

moving a region that is to be irradiated with a laser beam in a predetermined direction by a predetermined distance, and newly defining a first region on the surface of the layer formed of the amorphous material so as to partially overlap a immediately previous second region; and

repeating irradiation of the laser beam on the surface of the layer formed of the amorphous material and movement of a region that is to be irradiated with the laser beam until

a crystalline region of the amorphous material reaches a desired size.

2. The laser processing method of claim 1, wherein the first and the second regions are defined as a rectangle shape on the surface of the layer formed of the amorphous material.

3. The laser processing method of claim 1, wherein the first and the second regions on the surface of the layer formed of the amorphous material are defined as a sawtooth shape.

4. The laser processing method of claim 1, wherein the first and the second regions are defined on the surface of the layer formed of the amorphous material as an arch shape.

5. The laser processing method of any one of claims 1 to 4, wherein the first region and the second region intersect with each other.

6. The laser processing method of any one of claims 1 to 5, wherein the amorphous material in a molten state in the first and/or the second regions is irradiated with an additional laser beam.

7. A laser processing apparatus which crystallizes an

amorphous material by irradiating a layer formed of the amorphous material constituting a substrate or a layer formed of an amorphous material on a substrate with a laser beam, comprising:

a light source for emitting a laser beam;

a first projection mask provided in an optical path of a laser beam formed between the light source and the layer formed of the amorphous material so as to define a first region on a surface of the layer formed of the amorphous material by letting the laser beam emitted from the light source pass through; and

a second projection mask provided in an optical path of a laser beam formed between the light source and the layer formed of the amorphous material so as to define a second region on the surface of the layer formed of the amorphous material by letting the laser beam emitted from the light source pass through.

8. The laser processing apparatus of claim 7, wherein the laser light source includes a first laser light source for emitting a laser beam for irradiating the first region and a second laser light source for emitting a laser beam for irradiating the second region.

9. The laser processing apparatus of claim 7 or 8, further comprising an additional laser light source for emitting a laser beam for irradiating the amorphous material in a molten state

in the first and/or the second regions,

wherein a wavelength of laser light emitted from the additional laser light source is longer than a wavelength of laser light emitted from said laser light source.